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141

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EDITORIAL

For three years the journal has served the interests of the undergraduates in Medicine and more and more as time goes on it is finding its place in undergraduate life. Our chief concern in presenting Volume IV. is that the readers will realize that the Journal is here to serve their interests, and that they will take advantage of the opportunities which it offers. Constructive criticism of the Journal itself and open discussion of any phases of our medical education is invited.

The Journal should be increasingly used for undergraduate expression. Here you should learn for yourself the rudiments of writing scientic or historical articles. Don't wait for some one to tell you what to do. Get busy, think, read, think and then write. The problems which face the Medical world to-day are as great as they ever were. In a very short time we will be facing those problems ourselves with no teacher or professor or clinician to appeal to, because we will be the medical profession of that soon coming day. Let us prepare ourselves in every way for our life-work. When Volume IV. is written may it adequately reflect our keen desire to give of our very best in the interests of our noble profession.

"In my opinion you in Toronto have perhaps the finest Medical School in North America." These words were spoken to the writer by a prominent surgeon on the staff of one of the leading Medical Schools in the United States. Such words cause one to enquire into the facts which justify such a statement. Due to our political and geographical relationships, Medical thought in Toronto is in a very favourable position to intelligently consider and pass judgment upon all new ideas and recent advances in the Medical world. Our close geographical and economic connections with the United States bring many of their best men and much of their Medical literature to our immediate notice. On the other hand our loyalty to British institutions and our great respect for the Medical profession in Britain stimulate our interest in British publications, and foster postgraduate study in the Mother country.

The teaching of Medicine in Toronto is in that happy stage of its evolution when there is sufficient didactic instruction and yet the student has to depend on his own efforts to succeed. Spoon-feeding has not become too prevalent as one is lead to believe it has in many of the better schools in the United States.

But if we as a Medical School have any claim to greatness, we owe it to the great men among our teachers who have made the name Toronto famous throughout the world as one of the chief seats of advancement of Medical Science. In their work lies our individuality as a Medical School. Thus we see that our environment here as undergraduates in Medicine is such that we have almost unlimited opportunity to learn and every encouragement to put forth our best efforts.

Royal College of Surgeons—England.

In the J.C.M.A. of September, 1926, is a report of the committee of the Association on the R.C.S.E. It is interesting to note that there are but thirty fellows of the College in Canada. In order that the fellowship may be brought within the financial reach of more Canadians a committee was appointed to ascertain the possibility of holding fellowship examinations in Canada. Dean Primrose was Chairman of this committee. In his report he states that a committee of the College is considering the ques-

tion. It is at present desired that the Primary examinations in Anatomy and Physiology be taken in Canada, the candidates proceeding to England at a later date for the final examination. This would entail great saving to candidates and would bring the degree of this grand old College within the reach of many Canadians who for financial reasons cannot under present conditions hope to attain it. The C.M.A. has also placed itself on record as being in favour of the formation of a college of physicians and surgeons of Canada. This is a praiseworthy attempt of the association to raise the standards of the practice of medicine and surgery in Canada and to recognize such standards by properly constituted Canadian authorities.

Welcome 3T2.

The Medical Society through its Journal welcomes you among us. It wishes to compliment you on your numbers and quality, and hopes that you will very soon find your place in undergraduate life. May you strike the happy balance between work and recreation, and may you have a successful journey through Medicine. Here is something for you to buy and read.

The Study of Medicine.

ALEX MILES, M.D., F.R.C.S.
Consulting Surgeon Royal Inf. Edin.

This brochure was written with the idea of helping the student at the beginning of his course to realize the unity of the medical curriculum. The necessity of an understanding of the principles of the pure sciences, Physics, Chemistry, and Biology in order that one may properly appreciate Anatomy, Physiology, and Pathology, is ably shown. The author has found that students are too apt to regard their pre-clinical subjects as separate entities instead of taking them at their true value as the broad foundations of medical knowledge.

Do not fail to read Dr. Tisdall's article on Sunlight and Health. It is an excellent demonstration of the importance of your first year subjects in the understanding and solution of a great medical problem.

Special Offer to Undergraduates.

The Journal offers Volume IV. free to the writer of the best article written by an undergraduate in each issue of this volume. The articles will be submitted by the editorial staff for approval of judgment by a member of the Faculty.

ODE

TO A DISSECTION OF THE GLUTEAL REGION (ROOM I., SPECIMEN 136) IN THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND:

I envy you, my beaming boy,
And wish I could inherit
The lot to live my life like you,
In pints and pints of spirit.

For there you sit in ecstacy
Like Love amidst the flowers,
And never take the slightest heed,
Of legal closing hours.

Oh would that those in Parliament,
Could see the look of sweet content
Infusing your integument,
And all with one accord relent,
And give to us with kind intent,
Your consummate environment.

If doing so they'd change those laws
(For which there never was a cause),
From legislation set us loose
To soak in alcoholic juice.

But after half an hour's reflection
Matters assume a new complexion;
It's plain the rapture of your soul
Cannot be caused by alcohol,
For all the physiologists
And quite the best histologists
The presence heatedly deny,
Of taste buds in the glutei.

—F. W. J. W.
Camb. Univ. Med. Soc. Mag.

The Interpretation of Symptoms in Chronic Gastro-Intestinal Disease.

E. E. CLEAVER.

A CONSIDERATION of symptons in chronic gastro-intestinal disease demands a clear conception of gastric and intestinal physiology with a particular knowledge of the various activities of smooth muscle. It also demands a knowledge of the development of the abdominal organs and their nerve attachments, and lastly it requires an appreciation of the value of a careful history.

Disturbances of secretion are responsible for a few symptoms but the majority of visceral symptoms are related to the activities of smooth muscles. The mucosa of the alimentary tract is not sensitive to tactile, thermal or chemical stimuli, except in a limited portion from the teeth to the pylorus. The lower end of the oesophagus is sensitive to thermal stimuli,—for instance, cold drinks or ice cream produce the well-known brow pain, a reflex of the oesophageal branch of the vagus, referred by the fifth nerve to the brow.

Regurgitation of acid contents from the stomach into the oesophagus is said to be responsible for the production of so-called heartburn. Reichmann carried out a series of experiments with gelatine covered sponges, with attached strings. These capsules were swallowed and allowed to remain in the oesophagus for one hour and then withdrawn. The contents were expressed and gave the characteristic reaction for HC1 in cases of heartburn. Normal controls showed no free HC1. Recent experiments do not confirm the work of Reichmann.

In the stomach, Carlson, Hurst, and others have proved that chemical stimuli do not produce any sensation of the gastric mucosa, either under normal conditions or in the presence of a gastric ulcer. Carlson has definitely proven that the gastric mucosa is sensitive to themal stimuli,—that is, to water at a temperature of 50°C. or 10°C. Hurst believes that the mucosa is not sensitive to thermal stimuli. Alcohol, mustard or pepper, introduced by a tube into the stomach, produces various degrees of pain, accompanied at first by a peculiar feeling of warmth.

Although the mucosa of the stomach is only sensitive to thermal stimuli, the stomach has, in health, a sensibility of its own. These sensations, according to Ryle, are four,—the first hunger, second appetite, third satisfaction, and fourth repletion. Carlson, after numerous experiments, concludes that the local element in the sensation of hunger is dependent upon the tonus and contractions of the gastric musculature. He also does not believe that hunger and appetite are different intensities in the same sensation curve. Ryle draws a very interesting comparison,—appetite is a pleasant and hunger an unpleasant sensation. Appetite may occur when the stomach contains food. Hunger occurs when there is undue abstention from food. Appetite is a daily experience. Appetite may occur without hunger but hunger seldom without appetite.

In the state of satisfaction there is no sensation, the stomach walls are adequately relaxed and muscle fibres have assumed a normal posture. Repletion may give rise to sensations which are mildly uncomfortable or definitely painful and is experienced when the stomach is over-filled or too rapidly filled.

Cannon's theory of the acid control of the pylorus is at present being challenged. The radiologist has shown that the duodenal cap or bulb generally fills during the first few minutes after the taking of a barium meal. Again, in the cases of achylia gastrica, we frequently find the stomach empty in half to one hour after ingestion of a meal. The acid may indirectly be responsible for the relaxation of the pylorus but that HC1 forms the major part in the control of the pylorus seems doubtful.

The observations of the physiologist and the radiologist have been most helpful in the study of the movement of food contents in the alimentary tract. When a solid bolus passes into the upper end of

the oesophagus, the first law of the intestine comes into action. There is relaxation in front and contraction above and behind. The bolus requires from four to five seconds to pass from the upper to the lower end of the oesophagus. When the bolus reaches the lower end of the oesophagus, the cardiac sphincter relaxes and a reflex inhibition of the musculature of the stomach takes place to receive the oncoming bolus. In the case of fluids, we find the fluid arrives two or three seconds before the peristaltic waves reach the cardiac orifice. In the stomach, we find the peristaltic waves commence at the cardiac orifice on both the lesser and greater curvatures. The amplitude of the peristaltic waves at the cardia are very small, but they slowly increase in depth until their arrival at the pyloric antrum, and here we find the waves almost cutting the stomach in two. If there is any interference with the passage of the wave along either curvature, the waves may fail to arrive synchronously at the pylorus and the result is reflex peristalsis, with nausea and vomiting. Immediately following the arrival of the peristaltic waves at the pylorus, there is a relaxation of the pylorus, and the duodenal cap fills. There is some doubt as to whether every peristaltic wave reaching the pylorus is followed at once by filling of the duodenal cap. Under normal conditions, the barium meal passes readily through the duodenum, jejunum and terminal ileum. Four to five hours after taking the meal, the barium commences to enter the caecum. In the caecum, the contents of the bowel are subject to a churn-like action. Both peristaltic and anti-peristaltic waves occur. In the colon, the movement of the contents of the bowel is very slow, and there is a mass movement that takes place once or twice a day. Under normal conditions, the contents of the bowel reach the splenic flexure in about ten hours and the rectum in eighteen to twenty-four hours.

Alvarez has pointed out that the mechanism producing peristalsis is to be found in the wall of the gut. The circular fibres contact after removal of Auerbach's plexus. He also points out that smooth muscle is more sluggish than striated muscle,—slower to react and slower in recovering original length. Smooth muscle is able to maintain a firm and lasting contraction without fatigue. Smooth muscle reacts to tension. Smooth muscle shortens under influence of direct irritation.

It does not fall within the scope of this paper to discuss in detail the nerve connections of the viscera, but some mention must be made of the bulbo-sacral outflow (parasympathetic) and the thoracic lumbar outflow (sympathetic). The abdominal viscera are connected through the sympathetic system with certain definite metameres or segments of the spinal cord. We assume that both afferent and efferent impulses pass to and fro in connection with these spinal segments. The nerve connections of the stomach are related to the 6th, 7th and 8th dorsal segments; the duodenum to the 9th; the appendix to the 7th and 8th; the colon to the 11th and 12th; the liver 6th to the 10th; the gall bladder to the 10th and the pancreas to the 10th and 11th dorsal segments. The dorsal segments have their nerve connections with the skin, muscle and connective tissues of the abdominal parieties. Regarding the contractions of smooth muscle fibres of the gastro-intestinal tract, efferent fibres travel both in vagus and sympathetic; sympathetic mainly to the sphincters and the vagus through Auerbach's plexus to the musculature of the visceral wall.

Goldie points out the importance of a careful history. He states that 80 p.c. of the points of evidence upon which a diagnosis is based arise directly from the history, 15 p.c. from physcal examination, and less than 5 p.c. from laboratory findings. In investigating a case presenting gastro-intestinal symptoms, attention should be directed towards determining: First the nature of the complaint; second the duration of the complaint; third the character of the symptoms (have they remained the same since onset?) fourth, have there been periods of freedom from symptoms? Fifth, have the symptoms been produced by unusual exercise, indiscretion, etc.? Sixth, have the symptoms been relieved by change of diet, manner of living, etc.? It is often very difficult to obtain a clear history from patients in the wards of a general hospital. Many of the patients are foreigners and understand very little English. We find that the history of the gastro-intestinal activities throughout the

24 hours is very helpful. We commence by asking the patient whether he has any symptoms before breakfast; whether he has any symptoms after breakfast; and we continue this investigation of his daily cycle throughout the day and night until the following morning.

I wish now to discuss certain outstanding symptoms seen in gasto-intestinal disease, 1st anorexia, 2nd nausea, 3rd vomiting, 4th heartburn, 5th water brash, 6th flatulence, 7th pain.

In ANOREXIA, we have diminished tone or muscular rigidity of the stomach. In fatigue the smooth muscle of the stomach has loss of tone. Emotion, worry, etc., may cause impaired gastric tone, probably due to the influence of the sympthetic nervous system. In acute fevers and chronic systemic infections, muscular tone is impaired. In chronic alcoholism loss of appetite is due to general effect of poison on muscular function and metabolism and excessive secretion of mucus, which prevents normal stimulation of gastric mucosa. In the alcoholic, appetite for breakfast is very poor.

We generally see anorexia in cases of marked visceroptosis, with an associated hypotonus of the stomach. In carcinoma of the stomach, when there is involvement of the body wall, there is loss of appetite. Absence of free HCL is generally associated with loss of appetite.

Loss of appetite may not actually exist. Patients frequently are afraid to eat because the taking of food causes distress or pain,—example, gastric ulcer, carcinoma of the stomach and in certain nervous and reflex conditions of the stomach. A poor appetite with a rapidly developing sense of fullness suggests structural disease of the stomach or a hypotonic stomach in a state of general poor health. In contrast, a good appetite with a rapidly developing sense of fullness suggests a small hypertonic stomach,—as in disease of the biliary tract.

NAUSEA.—Carlson points out that the sensation complex of nausea and vomiting may be initiated by stimulation of nerves in gastric mucosa, but many of the sensory elements in nausea involve a mechanism outside the stomach. The sensation of nausea is associated with a feeling of bodily weakness and a characteristic pain and distress, (sinking feeling). Frequently one may experience headache, dizziness, chills (from cutaneous vasoconstriction and sweating). Reverse peristalsis occurs in the stomach.

VOMITING.—In considering the causes of vomiting, there are: 1st, Those acting directly on the vomiting centre. 2nd, Those acting reflexly on the centre.

Central stimulants acting directly on the vomiting centre are toxic in nature, and include tobacco, toxins of uraemia, etc. Reflex causes: Stimuli acting reflexly on the vomiting centre include stimuli from the stomach itself and, by afferent fibres, from other parts of the body by the vagus.

A.—Gastric. Improper food, excessive ordinary food, irritant poisons, ulcer and malignant diseases of the stomach, and hepatic cirrhosis.

B.—General visceral causes, appendicitis and peritonitis generally, intestinal obstruction, Dietl's crises, pelvic diseases, pulmonary tuberculosis, violent coughing, shock from a blow on the epigastrium.

C.—Through the central nervous system:—

1. Through the special senses, taste, smell or sight.

2. Brain, concussion, meningitis, haemorrhage, tumor, mal de mer, hysteria.

3. Spinal cord. Gastric crises of tabes.

HEARTBURN.—The mechanism of this symptom we have already discussed. It is frequently met with in gall bladder disease, pregnancy, visceroptosis, so-called chronic appendix and rarely in duodenal ulcer. Heartburn not infrequently occurs as a persistent symptom for years, in cases in which no organic lesion can be demonstrated.

WATER BRASH.—Water brash may be defined as regurgitations of mouthfuls of clear, tasteless fluid, probably from accumulations of ordinary saliva and mucus in the oesophagus. Water brash occurs as a symptom occasionally in gastric ulcer. Two cases of carcinoma of the stomach that came under my observation had water brash as the only outstanding symptom for a period of several months.

After a hearty meal, reguritation of food occurs involuntarily and without strain or nausea, due to the relaxation of the cardia. It also occurs during periods

of fatigue or in anxiety states. Regurgitation of food also occurs in cardiospasm, when we have a closed cardia.

FLATULENCE and DISCOMFORT.—These symptoms are met with in two different types of stomach. In the hypertonic, steer-horn type we find the greater curvature of the stomach three to four inches above the intercristal line. Discomfort commences shortly after taking a meal. This condition is illustrated in patients suffering with gall bladder disease. In contrast, the hypotonic, hook-shaped stomach is characterized also by a sense of fullness; greater curvature frequently three to four inches below the intercristal line; seen in viseroptosis and in cases of pyloric obstruction with associated dilatation. Epigastric fullness and discomfort lead naturally to the consideration of the symptom of gastric flatulence.

Flatulence is due to: (First)—swallowed air, probably accountable for 90 per cent. A certain amount of air is swallowed with saliva and food. (Second)—Regurgitation of gas from the duodenum. (Third)—Gas resulting from diffusion through the stomach wall. (Fourth)—Gas resulting from fermentation in cases of pyloric obstruction. Gastric flatulence may be defined as a feeling of pressure high up in the epigastrium, often underneath the sternum and sometimes widely diffused throughout the chest. Flatulence rarely ever produces actual pain, but is characterized by intense discomfort, often so marked that the patient wishes he could plunge something into the epigastrium to relieve the condition.

Flaulence coming on immediately after a meal, with a relaxed cardia and associated belching, is frequent in individuals who overeat. Flatulence occurring one-half to three-quarters of an hour after a meal is frequently a symptom in gall bladder disease. When the discomfort becomes acute, the individual, in an endeavor to relieve the symptom, swallows air and forces the cardia. Before the cardia can contract down, the gas, and, not infrequently, some of the contents of the stomach are forced through the cardiac orifice into the oesophagus, producing the belching, reguritation, etc. This phenomenon is accentuated by the contraction of the strong abdominal muscles. Patients frequently repeat this process many times and appparently it affords them some relief, although there is very little change in the amount of gas in the stomach.

PAIN.—Visceral pain is by far the most important symptom in chronic gastro-intestinal disease. Hilton says: "Every pain has its distinct and pregnant signification if we but look for it." In investigating visceral pain, we have to consider several points:

1st—The character of the pain. Is it intermittent or continuous?

2nd—Type. Is it burning, boring, dull or acute?

3rd—Is pain general or localized?

4th—Radiation of pain.

5th—The timing of the pain. The relationship it bears to the functioning of the stomach, gall bladder, etc.

6th—Is the pain relieved by the taking of food, alkalis or vomiting?

7th.—Is the pain increased by the taking of food?

8th—Is the pain continuous? Is the pain recurring day after day after the same meal or meals? Are there intervals of weeks or months of entire freedom from pain?

9th—Is the pain aggravated by exercise?

It is very important to see your patient when he has the pain. He is able then to define more clearly its character, radiation, etc.

Visceral pain may be classified as: (First), intermittent; (second), constant; (third), postural; (fourth), capsular.

First—Intermittent pain is due to excessive muscular contraction and the stretching of contracted muscle. Pain due to excessive muscular contraction is not constant, but the pain due to the stretching of a contracted muscle is more prolonged. Pain of this type is at its height during muscular activity. In gastric ulcer at or near the cardia there is little or no pain. At the cardiac end of the stomach there is no marked muscular contraction and the amplitude of the peristaltic waves is small.

Gastric ulcer involving only the mucous coats of the stomach does not produce pain. Introduction of dilute HCL by means of the stomach tube in a case of

gastric ulcer does not produce any gastric sensation. When gastric ulcer has existed over a long period, it frequently loses its periodicity and becomes somewhat continuous in character. This generally indicates a chronic perforation with perigastric adhesions.

The pain of gastric ulcer is generally relieved by the taking of soda bicarb or the emptying of the stomach. This is probably due to the lessening of muscular spasm and gastric tension..

The variability of pain in gastric ulcer may be due to the differences in properties of smooth muscle.

In duodenal ulcer we may have the intermittent type of pain. This pain occurs from one to four hours after meals. Pain may occur after every meal and during the night. Frequently it may only occur after the midday meal,—i.e. at from 3 to 5 p.m. The pain varies in character, just as in gastric ulcer, and may be burning, tearing, gnawing, etc. The location of the pain in the epigastrium is variable. Most frequently it is limited to the left of the medium line and above the umbilicus, although not infrequently it is localized on the right side. The pain in duodenal ulcer is practically always relieved by taking food. Water rarely relieves it. Soda bicarb. frequently does. Pressure also often affords temporary relief. If the pain is not relieved by the taking of food, pressure and an alkaline mixture, it is very unlikely that we are dealing with an uncomplicated duodenal ulcer.

Duodenal ulcer may give symptoms for weeks or months, with a daily history of pain, and then be followed by a remission of symptoms for months or years.

We meet with a certain number of cases that do not present the characteristic symptoms of pain but have nausea, distress, discomfort or even heartburn, occurring with a definite periodicity. Again, we have a smaller group of patients who present a picture closely simulating ulcer. Pain occurs with a definite periodicity but persists only for a few days at variable intervals. Pain does not always occur after the same meal. This type of case also is relieved by the taking of food. Frequently, we find no evidence of an intrinsic lesion in the duodenum but find evidence of an extrinsic cause, such as appendix, caecum, gall bladder, etc.

Second.—Continuous or peritoneal pain is characterized by persistent pain, gradually increasing in intensity and associated with general constitutional picture of peritonitis. This naturally falls into the group of acute abdominal conditions.

Third.—Postural pain arises when tissue is stretched or pressed upon and is relieved by change of position or posture. It is seen in cases of lymphangitis and perilymphangitis, extending from ulcer or carcinoma.

Fourth.—Capsular. This occurs when we have a rapid enlargement of an inflamed solid organ, such as liver, spleen, etc. This type of pain is constant in character.

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Laennec and The Stethoscope.

SIR BERTRAM WINDLE, F.R.S.

RENE THEODORE LAENNEC was born in 1781 and died in 1826, hence it is just a century since the discoverer of the stethoscope left this world and, this being his centenary, it is perhaps well to recall the prominent points in connection with the man and his discovery.

Laennec was born at Quimper, in Brittany, and was thus one of the numerous distinguished members of the Breton people. He was first educated by his uncle the Abbé Laennec and later on by another uncle, a Doctor of the same name, and doubtless it was that fact which directed him to the medical profession. He studied in Paris, at that time a school of medicine of the first repute in which one of the greatest luminaries was Corvisart whose favourite pupil Laennec became. After a time at the Beaujon Hospital as a member of the staff, he was appointed a physician to the celebrated Necker Hospital and there it was that his great clinical success was obtained, for, according to his contemporaries, he was the ideal clinical teacher of his time.

About Laennec's time Auenbrugger, an Austrian physician, first made known the method of percussion and when Laennec added auscultation the methods of the physician in physical examination of the chest were pretty well what they are at this moment. Not that doctors had not listened to their patient's chests before that time but they had done it by placing their heads directly on the skin. Laennec discovered the better way. It occurred to him that one heard very distinctly any scratching at one end of a rod of wood if the ear were applied to the other end. When that idea came to his mind he was examining a heart case in a young patient and "immediately on the occurrence of this idea" he wrote afterwards, "I rolled a quire of paper into a kind of cylinder and applied one end to the region of the patient's heart and the other to my ear. I was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear." Thus was the discovery made and the instrument we all are familiar with introduced to the medical profession. Not in its present form by any means and as a matter of fact the old form would not be recognized by students of to-day. I judge by the fact that a learned doctor, asking me if I had a stethoscope in the house and being presented with that which I used as a student and keep as a remembrance, put the wrong end to the chest and admitted that he had never seen such a thing before. It consisted of a flat piece for the ear and a wooden tube passing through the same with an expanded end for the chest like the end of the tube which is used with the binaural of to-day. Round the earpiece end was a thick rubber ring, like a solid tyre, which made it available as a percussor. Mine is a rather heavy implement named after the late Sir Francis Cruise, but most of them were quite light. When I qualified no respectable medical man ever appeared in public except in a frock-coat and a top-hat; in fact the first thing that the newly fledged practitioner had to do was to wheedle some long-suffering tradesman out of these essentials. Having accomplished that feat, he went to the surgical instrument maker who fixed into the roof of his "topper" and of course inside, a kind of clip, in miniature exactly what is used for holding billiard cues. Into that clip was fixed the stethoscope and the young doctor went out thus prepared to open that oyster, the world. Years afterwards came in the much improved binaural and, as I have said, the younger members of the profession would not know what Laennec's stethoscope was if they saw one. But the principle is the same and it is the principle which we owe to the man of whom I am writing. Like most of those from the part where he was born he was an exceedingly pious man as testified to by a tale told in most of the books about him. He and his wife were being driven to Paris and were employing their time by saying the rosary together. The carriage turned over—no very uncommon incident on the bad roads of those days. Both were thrown out but neither hurt and when they were once more on their way Laennec's first remark was, "I think we were at the fourth decade, let us recommence there." He had an immense number of patients private and public and naturally

many affected with pulmonary troubles. It is probable that it was from one of these that he became tuberculous and of course the possibility of the contraction of that disease from another was then unknown. He went back to his native place in the hope that the air there might be beneficial but the move was unavailing and he died, near where he was born, on the 13th of August, leaving to his professional brethren one of the most valuable legacies which man has ever left.

The Path of Glucose Oxidation In The Animal Body.

I. L. CHAIKOFF, M.A.

THE work of Meyerhof and Hill has shown conclusively that the isolated frog muscle can use only carbohydrates to provide it with the necessary fuel for heat and contraction whether on high fat diets or on normal diets. Furusuva observed respiratory quotients of unity (indicating the oxidations of carbohydrates only) in human beings undergoing severe muscular exercise of short duration. In long continued activity fat is called upon as the R.Q. falls below one but befeore its utilization it is probably converted to glucose. There can be little doubt that by the oxidatioin of the glucose molecule, the animal organism is furnished with the major part if not all of its energy.

If we ascribe to lactic acid the central position in the path of the degradation of the glucose in the animal body, we may consider this subject from two angles: the precursors of lactic acid and its oxidation products. Lactic acid will first be discussed. Then its oxidation products, pyruvic acid and acetaldehyde. Finally, brief mention will be made of the evidence bearing on the supposed precursors of lactic acid, namely, glyceric aldehyde, dihydroxyacetone and methyl glyoxal.

Lactic acid (CH_2—CHOH—COOH) is the only intermediate substance definitely known to occur during the normal breakdown of glucose in the animal body. The evidence has come chiefly from a study of the chemical changes in the contracting isolated frog muscle. Two phases can be recognized in muscular contraction. In the first or anaerobic phase, lactic acid makes its appearance and Meyerhof found that the loss in glycogen is precisely aquivalent to the lactic acid which is produced. During the recovery or aerobic phase, lactic acid disappears and is synthesised to glycogen, about one-fifth of the lactic acidi being oxidised to provide the energy necessary for this endothermic reaction. This phase in contradistinction to the former, is characterised by the utilization of oxygen and the production of carbon dioxide.

The anaerobic production of lactic acid from carbonhydrates is not confined to muscle for in the absence of oxygen, Bacillus Coli Communis breaks down glucose to lactic acid whereas in the presence of oxygen the very little lactic acid appears. (Stephenson and Whetham).

If a glycogen-rich liver be perfused outside the body, lactic acid is formed. In the glycogen-free liver, on the other hand, no lactic acid can be found. Glucose or fructose which may be added to the perfusion fluid is converted to lactic acid.

The lactic acid found in the animal organism is the dextrorotatory form. Yeast and tissues of cold blooded animals display the same affinity for d- as for l- lactic acid, converting both to glycogen. Only d- lactic acid seems to be utilized by the isolated tissues of warm blooded animals (Meyerhof). It is difficult to correlate this observation with that of Dakin and Dudley who found that the administration of 12 grams of l- lactic acid led to an excretion of 9 grams of glucose in the phlouzinised dog.

The simultaneous appearance and disappearance of lactic and phosphoric acids during contraction of the isolated frog muscle led Embden to suggest some twelve years ago that the lactic acid came indirectly from glycogen through an intermediary hexosephosphate, the socalled lactacidogen. Since then he has obtained from muscle the osazone of a hexosediphosphate. Meyerhof, however, has shown that the storehouse of the lactic acid is glycogen for its accumulation runs parallel with the loss of glycogen in the isolated frog muscle. This observer also found that only in the presence of an

alkaline phosphate buffer can all the muscle glycogen or any of the added glycogen be quantitatively converted to lactic acid.

A decrease in the inorganic phosphate of the blood is observed when glucose is ingested by the normal animal (Fisk). The injection of insulin to a normal or diabetic animal is followed by a parallel fall in sugar and phosphates.

Warburg demonstrated that amino acids can be oxidised in the presence of charcoal. In extending these observations to carbohydrates, Meyerhof found that while glucose was quite stable in the presence of charcoal hexosephosphoric acid underwent oxidation.

Clearly then, glucose before its conversion to lactic acid must pass through a stage in which it is synthesised to a hexosephosphoric acid.

Pyruvic acid (CH2—CO—COOH): The further oxidation of lactic acid is considered to be via pyruvic acid and acetaldehyde. The evidence available, however, is far from conclusive for as yet no one has demonstrated the formation of pyruvic acid from lactic acid in the animal body. Indeed, Simon and Aubel recently failed to identify this substance in physiological fluids. When administered to normal animals, it is excreted as glucose and lactic acid; in the diabetic organism it is converted to sugar only. On perfusion through the glycogen-free liver it is converted with considerable ease to d- lactic acid (Embden and Oppenheimer). Perhaps the most important evidence as yet that pyruvic acid may play a part in the carbohydrate economy of the animal organism was furnished last year by Meyerhof who found that this substance may be synthesised to glycogen by the isolated frog muscle.

Much interest has centered about pyruvic acid because it iis believed to be the connecting link in the metabolism of carbohydrates, fats and proteins. Thus Embden showed by liver perfusion that the ammonium salt of pyruvic acid may give rise to d- alanine. Fat can be formed by yeast from the sodium salt of pyruvic acid (Smedley, Maclean and Hoffert). Embden and Oppenheimer observed that pgruvic acid when perfused through the liver will be converted to acetoacetic acid, presumably by aldol condensation from acetaldehyde since the latter was shown by Friedmann to give rise to acetaldehyde. Pyruvic acid is considered by some workers to be the starting point in the synthesis of fat in the animal body but as yet there exists no evidence for such an assumption.

Acetaldehyde (CH2—CHO) has been identified in the blood and urine of normal and diabetic animals. Stepp claims to have found an increased excretion in the urine of diabetic patients, but as difference in the acetaldehyde content of the blood of normal and diabetic dogs could be detected by other workers. The origin of this blood acetaldehyde is unknown but the possibility must not be overlooked that its precursor may be the alcohol produced in the intestine by bacterial action..

Strikingly suggestive evidence that acetaldehyde may be concerned in the disintigration of the glucose molecule by the animal organism has come from the laboratory of Neuberg. Its presence as an intermediary in alcoholic fermentation was first pointed out by Neuberg and his collaborators. They have also shown that it appears in the anaerobic oxidation of glucose by the many fungi and bacteria (B. COLI and B. Lactis Aerogenes). Hirsch identified acetaldehyde in the muscles of cold and warm blooded animals. Gottschalk and Neuberg observed that acetaldehyde accumulated when a fixer in the form of calcium sulphite was added to a suspension of pulpified liver or muscle of warm blooded animals. The addition of insulin doubled the rate of formation of acetaldehyde. That carbohydrate was the mother substance of this acetaldehyde became evident when it was shown that glycogen, d-glucose, d-fructose dioxyacetone and hexosemonophosphoric acid led to an increased production of acetaldehyde.

It is still an open question as to whether acetaldehyde form sugar in the diabetic animal. Tissues contain an enzyme—aldehydemutase—which converts acetaldehyde into alcohol and acetic acid. (Batelli and Stern, Parnas).

The mechanism in the animal body for the production of lactic acid from glucose is by no means clear. Workers in this field have pointed to methyl glyoxal, glyceriic aldehyde and dihydroxyacetone as the possible precursors of lactic acid. But as yet these substances have not been isolated in the animal organism and the available evidence is of an indirect nature.

That methyl glyoxal or pyruvic aldehyde (CH2—CO—CHO) may be intermediate in the formation of lactic acid from carbohydrates was first pointed out by Dakin and Dudley, and Neuberg who demonstrated that an enzyme—methyl glyoxalase—capable of rapidly converting methyl glyoxal into lactic acid is present in yeast and in all animal tissues except the pancreas. When administered to phylorhizinised animals, methyl glyoxal is excreted as glucose.

Embden rejects methyl glyoxal but is inclined to believe that glyceric aldehyde and dihydroxyacetone are the intermediate products between glucose and lactic acid. In the diabetic organism, inactive glyceric aldehyde forms d-glucose whereas in the tortoise liver it yields glycogen (Parnas). In the presence of fresh blood corpuscles or when perfused through the glycogen-free liver it gives rise to a mixture of inactive and l- lactic acid (Embden, Baldes and Schmitz). Using a method which detected one part in 500,000 Campbell could find no di-hydroxyacetone in the blood of normal or diabetic animals. When given per, os dihydroxyacetone was detected in the blood of normal and diabetic animals. In the latter case, the dihydroxyacetone content of the blood rose to a maximum and then fell, the fall occurring parallel with the rise in the blood sugar. When the liver is removed the organism cannot convert dehydroxyacetone to sugar for it can be recovered quantitatively in the blood and muscles.

Dihydroxyacetone is converted to lactic acid by fresh corpuscles. In the normal rat it is deposited as glycogen but Myerhof could not confirm the synthesis in the isolated frog muscle. In contrast to glyceric aldehyde dihydroxyacetone is capable of relieving hypoglycaemic symptoms due to insulin.

To sum up, it may be said that the evidence is conclusive for the appearance of lactic acid during the breakdown of glucose in the animal body. From the work of Neuberg, it may be assumed that acetaldehyde is also an intermediate. The occurrence of the enzyme glyoxalase in many animal tissues is of great significance. However, a decision as to whether pyruvic acid, glyceric aldehyde, dihydroxyacetone and methyl glyoxal should be considered intermediary in this oxidation must await more convincing proof.

The Present Position of Prostatectomy. *

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IF one is to discuss the status of any thing, one must compare it with something else, and I am inclined to compare the present situation in regard to obstructive diseases of the prostate to that obtaining a quarter of a century ago. At that time the situation was undeniably bad; the operative mortality was high, even in good hands—by which I mean the hands of those who were dealing with many of these cases. In their hands it was at least 25 to 30 per cent. The results, quite apart from mortality, were not good. Many of these people had persistent complications, in the form of fistulæ—perinæal fistula, recto-vesical fistula, recto-perinæal fistula, and so on, including supra-pubic fistula And, finally, a not inconsiderable proportion of them, though better off than they had been before, were by no means well enough off to lead a comfortable existence. The situation to-day shows a very great drop in the mortality. The mortality now, in the hands of the same group of people, experts, is probably between 5 and 10 per cent., and the complications are relatively few. That result has come about chiefly through a recognition of the fact that we can divide the risk to these patients into various stages or portions, and of them the most important is that of drainage. At the beginning of the century most of the operations were done on patients with a large amount of obstruction—larger, on the average, than is true to-day. Many of them were done on patients with complete obstruction, which had often gone on for many hours, even a day or more. The greatest risk to those people, though by no means the only one,

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comes in the sudden change of pressure under which the urinary apparatus is working. Slowly it has been recognized that preliminary drainage is essential for good results. Drainage may be carried out in one of two ways: it may be carried out by the introduction of a catheter, which is fastened in for a period of time, or by opening the bladder above the pubes and putting in a tube. Both methods are satisfactory; there is no choice between them provided they work, but they must work. In about half the cases the in-lying catheter will not provide satisfactory drainage; either it is gravely uncomfortable, which is a sufficient contra-indication, or it does not drain. This failure may be due to the peculiar conformation of the neck of the bladder, so that the end of the catheter sticks straight in the air; or it may be because the amount of inflammation or mucus or muco-pus is sufficient constantly to obstruct the drainage and make it unsatisfactory. Obstructed drainage is probably worse than no drainage at all. One should always assume—though it is not always true—that the upper urinary tract has been subjected to pressure, that the ureters are more or less dilated in company with the renal pelves, and that, in a proportion of cases—what proportion one cannot tell—the bladder and kidney pelves are a continuous canal. Obstructed drainage means a constant backwash, and the transference of the infection of the bladder, which is often greater than that of the upper urinary tract, back and forth from kidney to bladder, in a way which destroys the results of drainage. Drainage must be continuous, and must not become obstructed if it is to do its work. Occasional obstruction of drainage is not fatal, but any series of accidents which relatively frequently obstruct drainage suffice to provide a contra-indication to that method. Finally, there is the possibility that the presence of the catheter and its pressure against the middle lobe will produce ulceration, than which nothing is more uncomfortable to the patient, or more disastrous to drainage. In the face of these conditions, urethral drainage must be abandoned and supra-pubic drainage instituted. This requires only a simple operation, can be carried out, if necessary, under local anæsthesia, and should, of itself, cause very little upset to the patient.

The results of drainage are, I think, twofold. One of the results is certain; the other is somewhat less certain, but is hardly less important. The certain result is the relief of the kidney from a more or less continuous back-pressure, under which it has been working, in some cases, for years. It is a de-compensation, which is followed immediately by congestion and important interference with urinary secretion. If one watches the functioning of these kidneys during the first few days or a week after drainage has been instituted, one will almost always find a sharp drop in the function, which may run so low, as indicated by the sulpho-phenol-phthalein test, that it is practically immeasurable; and in the worst cases the nitrogenous content of the blood will rise, showing that apparently the condition of the kidney has been made worse by drainage. That was a condition which we elected to assume was part and parcel of the operation in the days when we undertook to open the bladder and proceed to remove the prostate at one sitting. In the uninfected cases, in which one sees an overdistended bladder and clear, uninfected urine, there is another sequence, which is inevitable, and that is infection. There is no method, I think, by which infection of a urinary tract hitherto uninfected, which has been subject to obstruction and back-pressure, can be avoided. I am inclined to regard infection as by no means an entirely objectionable business, but we should try to separate it from the insult incident to the operation of prostatectomy. In the case of the uninfected patient you must face an infection to which the kidney has not been subjected before, and in the case of the infected patient you often must face an increase of infection, but it is desirable that these should be separated, in point of time, from the insult of the operation itself. It is probably true that as a result of that infection, which quiets down though it does not get well in a reasonable time, a condition of immunity temporarily results. Consequently when you undertake the operation upon the prostate itself, you have not to face this infection of the upper urinary tract, which, at an earlier date, was inevitable. Therefore as

a result of dividing the process into two or more stages, one now has the insult to the patient incident to decompensation of a urinary tract subject to back-pressure, later in infection, not immediately superimposed upon decompensation, and finally at a time which we can select for ourselves, we have the insult of the operation. In earlier days all those came at once, and with very lethal consequences.

How long should drainage be continued? This question can only be answered in terms of the kidney function. There are many methods of testing kidney function, many of which are valuable. Those should be selected which can be done relatively easily and accurately, without needing a very high degree of skill, that is, you should select the methods which give reasonably sound evidence, and which do not require the constant presence of expert chemists or laboratory experts of any kind. We have come to depend on two groups of tests: those with a dye, which is, with us, sulpho-phenol-phthalein, which tests a part of kidney function, and the other the nitrogen content of the blood, either as urea nitrogen or non-protein nitrogen. Many of the tests, as I say, are valuable. There is no particular reason for preferring any, so long as you elect to use one set, and continue to do so, and thus create for yourself a standard with which you can compare all your patients.

Drainage should be continued until the kidney function of that patient is as good as it will become. That is universally less than one would regard as normal kidney function, though perhaps not importantly less than one regards as normal kidney function for people of the age of these patients, which, on the average, is something over 70 years. They are people whose kidneys have lived through a rough-and-tumble existence, and would not be expected to be normal under any conditions.

You will probably ask how to decide when function has become as good as it will become. Function will return at first slowly, to a point sometimes below, sometimes above its permanent level, and it will be found vacillating over a fair period of time. During this period of vacillation it is unwise to finish the operative procedure. The period of low function may persist for months, even for years. We have patients who are continued on drainage—never catheter drainage, because that cannot be continued for months with reasonable comfort, but supra-pubic drainage—for a year, occasionally for two years. At the end of that time there is achieved a stability of function which generally results in giving a satisfactory situation on which to superimpose the final insult of this episode, the operation itself.

It is probably true that, in the average patient who has not been the subject of prolonged retention, whose residual urine is not very great, and who does not come to you with clear uninfected urine, drainage for two or three weeks will be sufficient. The majority of cases will fall into that group. The patient with uninfected urine should always be excepted from that group, and should be expected to take six to eight weeks to get over, first the decompensation, and then the infection, with a return to a stable condition of moderate chronic catarrhal pyelitis, which protects them, I think, from a further infection at the time of the operation.

The question of how the attack should be made, assuming that the conditions are suitable for attack, may now be considered. The genito-urinary world has been torn for at least two generations between the school that favoured the high approach and the school which favoured the low approach. I, for my sins perhaps, was brought up as a perinæal operator, and probably I essayed all the various bizarre types of perinæal operation which have been put forward by sound authority. I am frank to confess to you that, though brought up in that school, I have entirely abandoned it, and have become a most confirmed supra-pubic operator, because I am convinced that in a large series of cases the best results will be obtained by that method. Looked at from our point of view, for those who have not come to a fixed opinion on this matter and are still young enough to change your minds with advantage, it may be said that the supra-pubic method of attack is a far simpler method, is open to fewer complications, and requires less skill on the part of the surgeon. The perinæal attack, I think, requires long experience and high skill, because there are other structures which have an inconvenient trick of getting

in the way. The rectum is supposed to occupy a normal and fixed position, but I ask you to take it from me that it does not always do so. It will be found in highly inappropriate positions, particularly at a time when one is demonstrating to one's colleagues the high degree of skill and deftness with which one can adhere to the line of cleavage betwixt wind and water in getting to the desired goal—the prostate. Opening the rectum does not always do much harm, and you can learn to patch the leak without much trouble, but in the hands of the relatively inexpert it does cause long-standing and troublesome complications. There will come to you regularly in the future patients upon whom someone else has had the accident of opening the rectum and has left the patient with a recto-vesical or perinæal fistula—a condition often very troublesome to repair!

I have convinced myself that, on the whole, the suprapubic method of attack deals with the problem here presented more satisfactorily. It is true, and it is a convincing argument to those who believe, even belligerently, in the suprapubic route, that, in dealing with the conditions causing obstruction, most of the obstruction, and in many cases the whole of the obstruction, will lie in the proximal half of the prostatic urethra. It may even lie at the extreme vesical termination of the prostatic urethra—a point readily accessible to suprapubic approach, and uncomfortably far from the perinæal approach. One ought to admit, I think, that the discussion is by no means ended, that the expert is quite entitled to proceed by either route, or by both, in appropriate cases, and that there is no reason for dogmatism in the matter. For the occasional prostatic surgeon—and with us, at least, probably more than half the operations upon the prostate are done by men who only occasionally deal with this condition—for the occasional surgeon I believe that the suprapubic method of approach should be regarded as the safer one. The suprapubic operation may be done as a second stage in the case of patients in whom one has elected to drain the bladder by the suprapubic route. In the worst cases, in the shaky patients, I believe it to be wise always to do stages, the first stage being suprapubic cystotomy with drainage, and the second stage simply the introduction of the finger into the suprapubic wound for the enucleation of the prostate. The first stage has had two desirable results—stabilized the kidney function, and walled off all the tissues surrounding the approach, so that infection will not occur. One of the important complications at an earlier date, and to-day an occasional complication of the one-stage operation where drainage has been carried out by the urethra, is the infection of the pre-vesical space, infection taking place rather easily there because of the fat and loose connective tissue, and the results of such infection are sometimes pretty serious. Earlier it was a common complication; to-day it is seen in the one-stage operations, never in the two-stage operations. For the very shaky patient who, apart from the condition of his urinary apparatus, is old, who has arteric-sclerosis, with, probably, emphysema, and, not unlikely, chronic bronchitis, and whose machine carries on simply by the Grace of God, the two-stage prostatectomy seems to me to be very desirable, even in the hands of the very expert; I do not except anybody in that field. I would further point out to you that though none of you would be interested in your mortality statistics, but would be willing to accept any mortality which might come to you in the proper prosecution of your work, yet some of your colleagues will be concerned as to the precise figures of their mortality. By the two-stage prostatectomy you can practically eliminate a large part of the mortality, because if these patients are going to die, it will be after the first stage, the drainage of the bladder, which is not prostatectomy! It is commonly the more risky procedure of the two in the shaky type of patient; he may not survive the decompensation and the infection or the increased infection, which must necessarily supervene, and so he will be gathered to his fathers without being added to our prostatectomy mortality statistics. This is likely, I suggest, to be at the bottom of some of the extraordinarily low mortality rates which one sees recorded, even in highly reputable publications. There are other methods, I know.

(Here the lecturer showed some slides on the screen.)

Here is a schematic drawing of the normal prostate showing the position of certain groups of glands, which are of first-class importance in the matter of adenomatous enlargements. Note the subcervical group, concerned chiefly with changes in the middle lobe. You see a real connective-tisse division between the lobes even in the normal prostate—a division much accentuated when the lateral or median lobe becomes the seat of adenomatous change.

This shows a cross-section through a prostate, indicating the extremely intimate relation between the adenoma and the mucous membrane. In some of the operations, particularly through the perinæum, it has been alleged that these adenomata are enucleated from beneath the mucous membrane. In my view that is a figment of the imagination, and cannot, in practice, be done. Here the mucous membrane has become atrophied, and compared with it, wet tissue paper is thick.

Next I show a low-power view of the changes in the so-called hypertrophied protate, showing a structure which used to be called "the surgical capsule," and has sometimes been referred to as "the capsule," but it is neither. It is, in fact, the prostate itself. The growths, which you see, compress the tissue of the prostate, forming a capsule, out of which the enucleation takes place. The lines of cleavage follow the outer limits of the adenomata, leaving behind the prostate. In earlier literature it was frequently said, "Mr. Jones, by his operation, removed the whole prostrate." Nobody, by any operation, ever did anything of the sort; the pathologist is the only person who can remove it entirely.

This is a cross-section showing a large increase in the lateral lobes and, to some extent, a compressed prostate behind. Adenomatous enlargement never involves the posterior lobe.

This drawing shows what happens when you have instituted supra-pubic drainage, and I call your attention to this button-catheter. Some such arrangement is desirable to enable one to pull the tube away from the prostate. At an earlier period this operation was commonly followed by great bladder irritation because the tube rested on the top of an already irritated middle lobe, and nothing could have been devised more certain to cause discomfort to the patient.

The next picture shows a common method of enucleating these large prostates through the suprapubic wound. The finger is introduced from above into the urethra and pushed forward until the apex of the enlargement is felt, at which point the mucous membrane is cracked through, and that point coincides very accurately, in most cases, with the openings of the ejaculatory ducts. After the enucleation has been started the finger is swept round towards the bladder, concerning itself with the structures of the sphincter, which may lie in varied relation to the adenomatous masses.

Here is shown the advantageous method of using the finger, that of the left hand, in the rectum to raise the prostrate towards the finger which has been introduced through the suprapubic opening. It gives accurate control, and enables one to proceed without fear of breaking through what is sometimes a fairly thin layer lying between the adenomatous mass, if it is large, and the rectum.

Here is shown the other of the benign types of obstructing prostate, sometimes called the sclerotic, sometimes the atrophic, sometimes the senile. The fact is that the prostatic gland tissue has largely disappeared and has been replaced by fibrous tissue. I see no reason to think that any inflammatory process is importantly concerned. The net results of operation are never as good as with the larger prostates.

Here is an instrument which was devised by Dr. Young, of Baltimore. It has an obturator, which is introduced through the shaft, with a circular cutting knife. It is introduced well into the bladder and the obturator withdrawn; then it is pulled back so that the vertical notch hooks against the bar. The knife is then pushed forward, and the portion shown is excised. It may be moved so as to take out any amount of tissue which is thought desirable. It was put forward to deal with patients without opening the bladder. But, in my hands, the bleeding is such that it

requires the services of expert suckers to keep the bladder free from clot. So I have used the instrument largely at the second stage in patients whose bladder had been opened above. There, under the guidance of the finger, with this instrument one can nip out sclerotic tissue to any reasonable extent.

At the earlier period to which I alluded. the mortality of the operation was also due, not inconsiderably, to failure to control bleeding. I was brought up—and carried on for many years—in the day when the amount of blood lost at operations on the protate would be a shock to the same surgeon if he had been doing any other operation in surgery. Blood poured from the wound, and the surgeon packed gauze in, put in a tube, and went home. Later he telephoned to his house-surgeon, "Did Jones bleed very much?" "No, not very much sir." What is "very much?" I don't know. They bled in disgusting quantity, and a large number of them died, of "uræmia," of "pneumonia," of "septicæmia," according to the classification. I hold the view that most of them died of hæmorrhage, I do not mean to say the bleeding killed them, but the bleeding reduced these necessarily shaky old people to the point at which they could not resist, where their kidneys would not work, where hypostatic pneumonia supervened, or infection was given free play. Therefore, as part of any operation you are likely to do you must control hæmorrhage. This can be done by various methods. The method we use is the introduction of a rubber bag which can be blown up. This is pulled into the urethra by a tube passed from above, and fills the cavity from which the mass has been removed. In this way the bleeding can be absolutely controlled. Other surgeons use various methods of packing. Another group makes a larger wound and sutures the neck of the bladder, picking up the bleeding points. I did that some years ago, but abandoned it, because it added unnecessarily to the time of operation.

I want to say just a few words on what one should regard as a good result. A good result should be the entire relief of the symptoms recognizable by the patient as obstruction. It should mean that the residual urine—whatever it may have been —should be reduced to between 1 and 2 oz. If it is insisted that absolutely complete restoration of bladder function is to be achieved by this operation, I say I do not think it is possible. I do not think these old bladders are always capable of entirely emptying themselves. But the residuum should not exceend 2 oz., and rarely reach 1 oz. If infection has existed before the operation, it should have disappeared or be much less. In not a few cases, infection which has persisted for years, due to the obstruction and the residual urine, will disappear; and in a fair number of cases the infected bladder, and, I hope, the urinary tract, will be restored to an uninfected but not a normal condition. You are entitled to require of this operation for the treatment of benign types of prostatic obstruction that the patient shall be restored to what is, for him, a normal condition.

Notes On The History of Urology.

GORDON S. FOULDS, M.B., M.S.

UROLOGY, comprising as it does a study of diseases of the urinary tract, was perhaps the very first branch of medicine to emerge from the cloud of ignorance of prehistoric times. A glance into the past will show how early in the history of medicine were the beginnings of urology. The first references we find are in the papyrus Eber's—attributed to 1553-1550 B.C. Here we find a number of prescriptions for the treatment of various disturbances of urinary function. No other references appear until the Ayurveda of Sucutra which is attributed to the 6th or 3rd century B.C. This ancient Hindu medical treatise contains a detailed description of perineal lithotomy, which was frequently performed by the ancient Hindu physicians on account of the prevalence of stone in India. It is said that the operation performed by the native physicians in India up to recent times has been essentially as described in the Ayurveda.

Knowledge of lithotomy evidently spread

from India to Egypt and here we find Celcus describing the same procedure.

The Ayurveda also contains directions for the dilatation of strictures by means of instruments, increasing in size every third day. Directions for injections into the urethra for diseases of the bladder are also given in detail.

The writings of Hippocrates, 460-377 B.C., contains numerous references to urologic subjects. The most important one is his reference to suppurating kidney (perinephric abscess?) He wrote, "As soon as a swelling has appeared in the region of the kidney, one should incise it down to the kidney." He also describes how a bladder calculus forms by concentric deposition of layers of urinary salts about a nucleus.

Celcus shows by his writings at the beginning of the Christian Era that operations for calculus, retention of urine, and fistula, were well developed; and describes catheterization for retention of urine from various causes including senility (benign enlargement of the prostate).

Galen and Aureliaus both show an interest in urologic subjects, the latter discussing a stone searcher.

During the middle ages surgery lay dormant for many long years. Medicine was in the hands of the monks "who disdained surgical operations". However, lithotomists carried on the little surgery that was done. Norcia, a town in Italy, was the centre from which lithotomists were trained. The art was passed on as a secret from one generation to another. These lithotomists were called or travelled to all parts of Europe.

Cutting for stone remained in the hands of these itinerant laymen until the French surgeon, Germain Colot, obtained the secret. On his return to Paris he received permission to operate on a criminal condemned to be hanged. Louis XVI. witnessed the operation in a church yard—"The patient showed great fortitude, was well in two weeks and saved his own life." Colot was appointed Royal Lithotomist and later operated on the King himself. The operation remained a family secret until Francois Colot, the last of the family, passed it on to the medical world in 1727.

The lateral operation which requires much more precision was first devised by Frére Jaques, who died in 1720. Though often in disgrace he is said to have cut more than five thousand people for stone and to have performed as many as sixteen operations in one afternoon. This operation was perfected by the great Cheseldon who was really the originator of the present "lateral operation for stone" which he was able to perform in 54 seconds.

It is through the influence of Cheseldon that England developed so many surgeons with keen interest in urology. John Hunter was one of Cheseldon's pupils. His writings contain ample evidence of his interest in genito-urinary diseases. Indeed, he inoculated himself with syphilis in order to study some phases of the disease. Among his pupils were John Abernathy who wrote a celebrated book on syphilis, Sir Ashley Cooper who published a classic work on the testicle, Sir Everard Home who wrote a two volume work on the hypertrophied prostate gland, and James Wilson who carried on researches on the external urethral sphincter.

Modern urology is built on the scientific developments of the latter half of the last century. Many factors might be enumerated, the chief of which were: The discovery of anaesthesia; the recognition of pathogenic organisms; the possibility of illuminating the bladder; perfection in ureteral catheterization; knowledge of antisepsis and of asepsis; the discovery of the Roentgen ray; and the development of methods of study of renal function.

Whole books have been written on each of these interesting subjects. The use of illumination of the bladder by means of tubes and reflected lights was an important step in the advance in modern urology. In 1806, Bozzini of Frankfort described his "Lichtleiter." This was composed of a small funnel shaped speculum through which light was reflected from a shaded lamp. No dilating medium was used and the portions of the mucosa were manipulated into view by a spiral spring. Poor illumination, the limited field of inspection and the pain caused in the examination limited its use.

Following the introduction of Bozzini's instrument, many other attempts were made. It remained for Max Nitze in 1878 to introduce the first electrically lighted cystoscope which all but overcome the obstacle of inadequate illumination. This early cystoscope utilized a galvanic current to keep a platinum loop at white heat. In produc-

ing adequate light the new obstacle of overheating became a real inconvenience. This discovery, coming as it did with the dawn of antiseptic surgery, provided in spite, of its many drawbacks, the greatest single stimulus to the study of urology.

Though in 1879, only two years after Nitze's first cystoscope was described, Edison invented the incandescent lamp, this discovery was not utilized in the lighting of cystoscopes until 1887, a delay of nine more years.

From this time on there were many minor improvements but the next milestone in the progress of the cystoscope was a modification of Albarran's who, in 1897, added a leverage device with which catheters were easily directed toward the ureteral orifices rendering ureteral catheterization less difficult. This accomplishment almost brought the kidneys within the range of the human eye and renal surgery was thereby given a great impetus.

It is said that "Gustave Simon, Professor of Surgery at Heidelburg, previous to 1871, had made a practice of dilating the female urethra with his forefinger and carrying the forefinger into the bladder and by it had guided a catheter into many a ureter." However, it took almost one hundred years from Bozzini's first presentation of the cystoscope till Albarran in 1897,. added the catheterizing device which made an instrument in general resembling the present day cystoscope. This evolution, as Moore points out, "required the efforts and ingenuity of some of the most brilliant minds of the profession, and the combined resources of surgeons, dentists, chemists, opticians, electricians, silversmiths, metallurgists, glass workers, and the wizard Edison whom I shall attempt to classify as he is more than an inventor."

Successful ureteral catheterization together with the development of the Roentgen ray made possible pyelography. Tuffier was the first to suggest the use of an opaque catheter and x-ray to outline the path of the ureter. It remained for Voelcker and von Lichtenberg, in 1906, to successfully inject an x-ray opaque medium through a ureteral catheter and so outline the renal pelvis and ureter on an x-ray plate. They used colloidal silver. This medium was discovered in an attempt by these workers to outline the bladder in a cystogram, and noting that it ran up the dilated ureter and partly outlined it and the renal pelvis. Many other substances have since been used until now sodium iodide which was advocated by Cameron, in 1918, has become almost universal. Fenwick of England was one of the earlist European urologists to advocate pyelography. Braasch's monograph "Pyelography" published in 1915 is still the most thorough work on the subject yet published. By means of pyelography, abnormalities in size and contour of the renal pelvis are detected and often the underlying cause made apparent.

Urologic diagnosis had not, however, attained its goal until an adequate means of study of renal function was found. Probably the earliest test described was cryoscopy which was introduced by Dreser, in 1892. This was followed by the use of phloridzin, rosanaline, methylene blue and indigo carmine. Of these, only indigo carmine has survived the test of time. In 1910, Rowntree and Geraghty described the phenol sulphone-phthalein test which has become generally used since that time.

Babington working with Bright in the laboratories of Guy's Hospital, in 1836, noted that the urea content of the blood was raised in renal disease. However, it was not until the beginning of the present century that Folin and other workers so modified chemical methods that estimations of the amount of retention of nitrogen substances in the blood could be made on a small quantity of blood as a clinical laboratory procedure.

In relating briefly the history of urology, I have omitted the inclusion of some epoch making discoveries which had a tremendous effect not alone on urology, but on the progress of medicine and surgery as a whole. Many of the more recent developments in urology as in other branches are yet too new to be estimated in their proper value. With the present perfection in mechanical and technical detail, advancement in the future will come from researches in the broader fields of chemistry, physiology and experimental medicine. With such co-operation we may look forward to a still more brilliant future.

Sunlight And Health. *

FREDERICK F. TISDALL, M.D. (Tor.)

BEFORE speaking of the importance of light in the growth, development and general metabolism of the body, we must first consider exactly what we mean by the term "light" or "light rays." Light is still generally regarded as a form of ether-wave energy the character of which is dependent on the length of the wave. Sunlight, or, to use the correct term, solar radiation, is composed of invisible heat rays which have wave lengths longer than 760 millimicrons (a millimicron is one-millionth of a millimeter in length), visible light which varies in length from 760 to 380 millimicrons, and invisible ultra-violet rays which range from 380 to 290 millimicrons in length. Although strictly speaking the term light should be restricted to the visible rays, the term light or sunlight is here used as meaning the total solar radiation.

It was first shown some 50 years ago that sunlight retarded the growth of bacteria. Later it was observed that this action was not due to the heat of sunlight or in other words to the infra-red rays, nor to the visible rays with the exception of some of the shorter ones, but almost entirely to the ultra-violet rays. It was also observed that the shorter the ultra-violet ray the greater was this lethal effect on bacteria. It is obvious on account of this action of sunlight that it is of inestimable value to mankind from the hygienic standpoint. This is one effect of sunlight to which I wish to draw your attention.

Our knowledge of the effect of light on the growth, development and metabolism of the body has been gained largely through the study of one disease, namely, rickets. It is therefore necessary for us to consider this disease in some detail, not only on account of the importance of the disease itself, but because its reaction to light gives us practically our only biologic test of the efficacy of different light rays. Rickets is a disease of infancy which occurs chiefly during the winter and spring months and in distribution is confined almost entirely to the temperate zones. It involves not only the osseous system but also other parts of the body, particularly the nervous and muscular systems. The earliest manifestations of the disease are restlessness, sweating about the head, the development of soft areas at the back of the skull and enlargement of the junction of the bony and cartilaginous portion of the ribs, the so-called rachitic rosary. Later the muscles lose their tone and the long bones become soft, which results in the development of the well known bow-leg and knock-knee deformities. The blood is characterized by a marked reduction in the concentration of the inorganic phosphorus, and a slight reduction in the concentration of calcium. The most important change produced by rickets, however, and one which is usually overlooked, is a general lack of resistance of the individual to infection. This is by far the most important result of the disease.

Rickets can be cured or prevented by the administration in the food of the so-called antirachitic vitamin which is present in large quantities in raw cod liver oil. The chemical composition of this vitamin is unknown. The beneficial effect can be accurately followed by the appearance of characteristic bone changes readily shown by X-ray examination, and by an increase in the concentration of the inorganic phosphorus of the blood. Rickets can also be cured or prevented by the exposure of the individual to ultra-violet rays.

The effect of ultra-violet rays on rickets was first observed about seven years ago in Germany. The criterion of cure was the appearance of the characteristic bone changes as shown by the X-ray. No studies were made of the effect of light on the metabolism of the body, however, until four years ago when it was shown almost simultaneously at New York, at Johns Hopkins and at Toronto, that ultra-violet rays produce in infants with rickets a marked increase in the inorganic phosphorus content of the blood. It is indeed remarkable in view of the fact that sunlight is the source

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of energy on this planet that this change in the phosphorus metabolism is the first undisputed effect of sunlight on the human organism which has ever been observed.

The shortest ultra-violet rays in the sunlight which reach the surface of the earth are 291 millimicrons in length, all rays shorter than this being absorbed by the layer of ozone in the outer limits of our atmosphere. This means that the ultra-violet rays of sunlight extend from 380 to 291 millimicrons in length. All these rays, however, are not equally effective from the metabolic standpoint. It has been shown, largely by the work of a New York investigator, that the effective rays are of a shorter wave length than 313 millimicrons. Therefore the rays in sunlight which are most essential for the well-being of the human organism range only from 313 to 291 millimicrons in length and constitute less than 1 per cent. of the total solar radiation.

There are a number of factors which influence the percentage of essential ultra-violet rays which reach us. One of the properties of these rays is that they possess very little power of penetration and the shorter the wave length the more readily is the ray absorbed. The shorter rays which are the most essential ones, are readily cut off by the smoke dust and moisture in the air. One need only note the amount of smoke which hangs over all our large cities to realize what an important factor this is. Unfortunately no statistics for American cities are available, but in the city of London, England, as compared with the country of England, and as compared with the Swiss Alps, the highest daily percentage of ultra-violet rays was found to be in the proportion of 6 to 23 to 41. In other words the smoke dust and moisture in the air of London, compared with the Swiss Alps cut off over 85 per cent. of the rays which are so essential to mankind. In Toronto we have so realized the importance of this factor that we are building a half-million dollar addition to our Hospital for Sick Children in the form of a convalescent home situated twelve miles outside the city.

The height of the sun in the sky is another factor which influences the percentage of ultra-violet rays which reach us. It is quite obvious that when the sun is low the rays pass through a greater distance of our atmosphere and in this way a larger proportion are removed. We find that the percentage of ultra-violet rays in the early morning or late afternoon sunlight is practically negligible. Also in the winter in the temperate zone the sun is so low that the percentage of ultra-violet rays even at midday is very small. Actual measurements show that in the northern part of the United States and the southern part of Canada only about one-tenth of the ultra-violet radiation is found in the noonday sunlight of January as compared with that of July. The importance of this reduction of ultra-violet radiation may be even greater than the figures indicate as the shortest and therefore the most effective rays are those diminished the most.

The prevalence of the use of glass in our modern life must be considered in this question of ultra-violet radiation. Ordinary window glass stops all rays shorter than 330 millimicrons in length. Although the light, which has passed through glass, is the greatest importance from the standpoint of vision and retains all the appearance of ordinary sunlight, it contains none of the potent ultra-violet rays. This fact cannot be too strongly emphasized because so few people realize that light which has passed through ordinary glass has been robbed of practically all the rays which are essential for health.

The last important factor to be considered is the effect of clothes. Ultra-violet rays cannot penetrate ordinary clothing. Even an open mesh removes over 50 per cent. of these rays. It is evident that to be effective the ultra-violet rays must fall on the unprotected skin.

We may conclude from all these facts that the effectiveness of solar ultra-violet radiation is dependent on:

1. The clearness of the atmosphere.

2. The height of the sun in the sky, which is in turn dependent on the time of the day and the season of the year.

3. The absence of glass between the individual and the source of sunlight.

4. The amount of the body directly exposed to the rays of the sun.

We have stated that rickets can be cured or prevented by two means, first the administration of the antirachitic vitamin and second by the exposure of the individual to ultra-violet rays. At first glance these curative agents appear to have no connection with each other, but recent experiments reported simultaneously from Wisconsin and New York have shown that their action is the result of a common factor. It was found that exposure of different food substances to ultra-violet rays resulted in the production in the food of some substance which possessed the same properties as the antirachitic vitamin. There is no doubt that this substance actually is the antirachitic vitamin itself. It was soon found, however, that in order to produce the vitamin it was necessary for the irradiated substance to contain either cholesterol, an essential constituent of animal cells, or phytosterol, the corresponding plant constituent. In other words, the antirachitic vitamin may be produced by exposure of cholesterol or phytosterol to ultra-violet rays. What chemical change is produced in these substances is unknown. We can make the antirachitic vitamin but we still do not know its composition.

We have to go but one step further to link up the common effect of ultra-violet rays and the antirachitic vitamin. Cholesterol in inert foods can be so changed by exposure to ultra-violet rays that the antirachitic vitamin is actually produced. There is ample proof that cholesterol in the living body is activated in the same manner. Observations have been made that milk from irradiated cows and eggs from irradiated hens contain more antirachitic vitamin than when the animals or birds have not been exposed to ultra-violet rays. Another suggestive fact is that the part of the body exposed to ultra-violet rays, the skin, has a very high cholesterol content. We may conclude therefore that the ultra-violet rays of sunlight produce in the skin the antirachitic vitamin which is carried by the blood throughout the different organs to exert in some manner a vital influence on the metabolism of the body.

The antirachitic vitamin of cod liver oil owes its efficacy to the ultra-violet rays of sunlight. The sea contains a great deal of vegetable matter and as water is comparatively permeable to ultra-violet rays a large quantity of this matter no doubt contains activated phytosterol. Small fish eat this vegetable matter and change the phytosterol into cholesterol. The cod then eat these small fish and store the activated cholesterol in their livers from which it is extracted in the manufacture of cod liver oil.

If the antirachitic vitamin and ultra-violet rays produce the same effect in infants and children are the ultra-violet rays necessary? Can they not be entirely replaced by cod liver oil? I think not. One reason is that the amount of cod liver oil which can be assimilated without the production of a gastrointestinal disturbance is limited. Although immeasurable benefits are obtained by the routine administration of 1 to 2 drams of cod liver oil 3 times a day to infants and children throughout the winter, the beneficial effect of summer sunlight is much greater. It is just possible that if the same amount of the antirachitic vitamin could be given in cod liver oil as is produced in the skin by the ultra-violet rays the effect might be the same. On the other hand, it is not positively known whether ultra-violet radiation does not increase the resistance of the individual regardless of the production of vitamin. It is very difficult to come to a definite conclusion as other factors must also be considered such as the greater amount of fresh air and exercise which children obtain in the summer. Also there is considerable indirect evidence that the visible and infra-red or heat waves of sunlight produce a beneficial effect on the body. In view of these facts it is reasonable to consider that although the antirachitic vitamin can produce the same vital effect on the metabolism of the body as is produced by some of the ultra-violet rays of sunlight; nevertheless sunlight if not absolutely essential for life is of the greatest importance.

Another question which may be legitimately raised is whether we get too much ultra-violet radiation in sunlight. Pigmentation or tanning of the skin which is produced largely by the ultra-violet rays acts as a protective measure. In the tropics it is well known that prolonged exposure to sunlight produces deleterious effects but it has been shown that this is the result of the heat rays and not the ultra-violet rays.

From the evidence at hand it is extremely doubtful that we can get too much ultra-violet radiation in sunlight.

All mothers should be told of the importance of sunlight as a factor in the production of healthy infants and children. The difference between sunlight and fresh air must be clearly explained as comparatively few mothers will follow instructions unless this is done. They will put their children out each day on the verandah or in the yard *but carefully protected from the direct sunlight.* We have found that the best results are obtained by telling mothers that they must get their children sunburnt. The objection will be raised that sunlight will hurt the baby's eyes. This is a tradition that has been handed down from generation to generation. In strong light infants close their eyelids which cuts off all the ultra-violet rays and most of the visible and heat rays. In Toronto we have exposed patients daily to sunlight for periods as long as four hours and have never observed any ill effects on the eyes.

In the winter it is practically impossible to expose more than just the face of the infant. As ordinary window glass cuts off all the vital rays it is useless to place the patient before a closed window. Certain American, English and German glass works have been experimenting in the manufacture of glass which will transmit these rays. It is expected that this type of glass will soon be on the market at a reasonable price.

Whenever possible even in the middle of winter the infant should be taken out on bright days for a time between the hours of 11 a.m. and 2 p.m. and the sun allowed to shine directly on its face. By April definite sun baths may be given. The infant should be protected from the wind, but the bonnet should be pushed well back to expose as much of the face and forehead as possible. It is advisable to turn the baby slightly on one side so that it may open its eyes without looking directly into the sun. Ten or fifteen minutes is quite long enough for the first sun bath as the skin of the infant burns very readily. The duration should be increased about five minutes daily until exposure to the direct sunlight lasts one hour in the morning and one hour in the afternoon. As soon as possible the hands, the arms and legs should be exposed. In the hot summer days the head should be protected from the heat rays and on very hot days it is advisable to give the sun bath between 9 and 10:30 a.m. If these instructions are carefully carried out a surprising degree of tanning will be obtained as early as the first of April. The amount of tanning or sunburn may be taken as a rough estimate of the effectiveness of the treatment.

So far the value of sunlight from the pediatric standpoint only, has been considered, but the beneficial effects are not limited to infants and children. Rickets practically does not occur in adults but there is no doubt that ultra-violet rays are intimately concerned with the vital processes of the adult organism. As has been stated, the great mortality in rachitic infants is due not to the bone changes but to the marked lowering of the resistance to infection. These infants die of bronchopneumonia and other similar conditions and constitute our greatest factor in infant mortality during the winter and spring months. There is no doubt that ultra-violet rays increase the resistance to infection of the adult as well as the infant and child. Experiments undertaken in England in which blood was removed from adults before and after exposure to ultra-violet rays show a marked increase in the bactericidal power of the blood after the individual had been exposed to the rays. The blood platelets, which are now considered to be connected in some way with the resistance of the individual, were also increased in number. These experiments constitute a direct proof that ultra-violet rays can increase the resistance of patients against infection.

There is no doubt that the whole population of our communities suffer from a lack of ultra-violet radiation during the winter months. As a result of this there is an increasing lack of resistance to disease which results in the production during the late winter months of our greatest mortality rate of the year.

It is beyond the scope of this paper to consider other specific effects of ultra-violet radiation as in the treatment of bone tuberculosis or the various skin diseases. The subject of artificial ultra-violet rays from

the mercury vapor quartz lamp has not been considered, as it is very unlikely that these lamps will ever be of general use from the public health standpoint on account of their expense. A discussion of the value of artificial ultra-violet radiation would constitute a separate address. The mercury vapor quartz lamp has not only its advantages but its disadvantages, and it is not out of place to issue here a word of caution against its present-day indiscriminate use in the treatment of almost every known pathological condition. This in time will minimize its real value and bring discredit to the medical profession.

Sunlight is essential to life. The rays which apparently are the most essential are the shortest invisible rays. They constitute less than 1 per cent. of the total solar radiation. They are readily absorbed by the smoke, dust and moisture of our atmosphere and on this account are markedly diminished in our cities. They are also diminished in the winter and in the early morning and late afternoon, due to the sun being lower in the sky and the rays consequently passing through a greater distance of our atmosphere. They are absolutely cut off by glass and clothes. These rays apparently act on a substance in the skin known as cholesterol and produce what was formerly known as the antirachitic vitamin. This is carried by the blood to the various organs and produces a vital effect on the metabolism of the body. No doubt many changes are produced but the ones we have definitely been able to measure are an increase in the calcium and phosphorus in the blood (the cure of rickets), an increase in the blood platelets, and an increase in the resistance of the individual to infection. If a knowledge of these facts can be disseminated throughout our communities, and applied by the people particularly during the late winter and spring months, it will result in a marked reduction in the incidence of disease and also will be the means of saving thousands of lives.

Diagnosis of Acute Abdominal Conditions. *

C. B. PARKER, B.A., M.B.

AN early diagnosis is most desirable in a case presenting an acute abdominal condition, and is made only by taking a careful history of the patient's complaint with particular reference to its mode of onset, and his previous condition, and by a due appreciation of the significance of the symptoms and signs that may be present. These latter fall into two groups: (1) General, e.g. shock or collapse, rise or fall of temperature, alteration in the frequency and character of the pulse. (2) Local, or symptoms and signs present in the abdomen itself. The general symptoms direct attention to the possibility of an acute abdominal condition, but seldom give an accurate clue as to its nature. The initial degree of shock and other general symptoms are not so important as their persistence. For example, there may be profound shock during an attack of colic or following a blow on the abdominal wall, while perforation of a viscus may cause very little or only transient shock. It is mainly on the local findings that reliance may be placed to determine the underlying cause. They include (1) abdominal pain; (2) cutaneous hyperalgesia; (3) tenderness; (4) muscular rigidity; (5) nausea and vomiting; (6) distention; (7) free gas in the peritoneal cavity; (8) free fluid in the peritoneal cavity; (9) abdominal or pelvic swelling; (10) rectal examination.

ABDOMINAL PAIN.—The viscera are insensitive to touch, or other ordinary stimuli. Mackenzie and others have shown that pain resulting from a lesion of an abdominal viscus is referred to the peripheral distribution of the spinal nerves arising from the same segments of the cord, with which the viscus is connected by the sympathetic. The abdominal viscera are innervated by sympathetic nerves connected mainly with the lower six dorsal segments, and these same segments sup-

*Based on Remarks on Diagnosis of Acute Abdominal Crises, by A. H. Burgess, B.M. 5, Dec. 11th. 1920.

ply spinal nerves to the abdominal wall. A lesion of an abdominal viscus therefore produces pain felt in the distribution of one or more of the lower six dorsal nerves, and as these have posterior and lateral branches in most cases, pain may be referred to the back or around the side of the chest, as well as, or even instead of, to the anterior portion of the abdominal wall. Pain from the stomach is referred to the epigastrium (5-8 dorsal nerves); from the duodenum to a point close above the umbilicus; from the small intestine and appendix to the umbilical zone (8-11 dorsal nerves); from the large intestine to the mid-hypogastrium Pain referred from the liver, gall bladder and bile ducts, supplied by the 5 to 9 dorsal nerves, is felt in the epigastrium and also sometimes at the lower angle of the right scapula (8 dorsal). Lesions involving the liver may irritate the phrenic nerves in the diaphragm and reflex pain may be transmitted to the superficial cervical nerves in the diaphragm and reflex pain may be transmitted to the superficial cervical nerves arising from the 3rd and 4th cervical segments resulting in pain in the shoulder.

Pain felt in the early stage of an acute abdominal condition is always of this referred character and is therefore not necessarily localized in the position of the diseased viscus. When there is an extension of the diseased condition involving the parietal peritoneum, the pain is felt at the site of irritation. The innervation of the connective tissue underlying the parietal peritoneum is through the spinal nerves, rendering accurate localization possible. A typical case of appendicitis nearly always illustrates the referred character of the pain. Subjective pain is first felt as referred pain in the umbilical zone. Later, as inflammation extends to the parietal peritoneum pain is felt in the right iliac fossa. If the appendix is near the peritoneum the pain in the right iliac fossa comes on early. If it is buried in coils of intestine the pain may not localize in the right iliac fossa, but the initial umbilical area pain may steadily become more generalized.

CUTANEOUS HYPERLAGESIA.—A diseased viscus sends afferent impulses to the segments of the cord with which it is connected by the sympathetic fibres, rendering these segments hyperexcitable. If the cutaneous nerves connected with one of these hyperexcitable segments receives a stimulus, such as a slight pinch, it is very probable that pain will be felt.

The area of the skin pinched is said to be hyperalgesic. The best method of exciting the reflex response is to grasp the skin and subcutaneous tissue firmly and draw them away from the deep layers of the abdominal wall. If the patient winces it is recognized as an abnormal reflex. Another method of eliciting this sign is to scratch the skin with a pin. Certain areas are especially susceptible and serve to indicate the organ at fault. They are not affected by the position of the organ in the abdominal cavity. Absence of cutaneous hyperalgesia does not exclude disease and if such disease seems probable for other reasons, the absence of hyperalgesia must be ignored. Ligat in his Hunterian lecture May, 1919, describes the following areas: (1) Gastric and duodenal area—maximum point midway between ensiform and umbilicus. (2) Small gut area—maximum point at the junction of the upper and adjacent fourths of a line drawn between umbilicus and symphysis pubis. (3) Great gut area—maximum point at the junction of the lowest and adjacent fourths of a line drawn between umbilicus and symphysis. (4) Gall bladder area—maximum point at the intersection of a horizontal line drawn from the tip of 10th right rib and a vertical line midway between the right mid-clavicular line and the umbilicus. (5) Appendix area —maximum point at the junction of inner and middle thirds of a line joining the right anterior superior iliac spine and umbilicus. (6) Fallopian tube area—maximum point at the junction of the lowest and adjacent fourths of a line drawn between the middle of Poupart's ligament and the umbilicus.

TENDERNESS.—This must be carefully distinguished from superficial cutaneous hyperalgesia. It is produced by pressure and is always a valuable sign. It is not due to direct pressure upon the diseased viscus, but is caused by stimulation of the sub-serous nerve plexus (connected

with cerebrospinal system) which has become unduly irritable by extension of irritation from the diseased viscus to the perietal peritoneum. Local tenderness is especially met with in acute inflammatory abdominal conditions—(appendicitis, cholecystitis, salpingitis, pancreatitis).

General abdominal tenderness—unless associated with involuntary muscular rigidity is not of much importance. If so associated it usually indicates peritonitis. It is important to distinguish between subjective pain, hyperalgesia and local deep tenderness, and a typical case of appendicitis illustrates the distinction. Subjective pain is referred to the umbilical area and is later transferred to the right iliac fossa. Cutaneous hyperalgesia is elicited at the appendix area described above. Local tenderness is usually at McBurney's point.

VOMITING.—Initial vomiting in an acute abdominal crisis is a purely reflex phenomenon and is of no special diagnostic value. The recurrence of vomiting after having definitely ceased usually indicates the onset of peritonitis. Persistance of vomiting from the onset is a characteristic of intestinal obstruction.

MUSCULAR RIGIDITY.—Stimuli from a diseased viscus reaching the spinal cord via the sympathetic may cause a reflex contraction of the abdominal muscles supplied by the same segments of the cord (viscero-motor reflex.) This is Nature's effort at protection similar to the muscle spasm around an inflamed joint. Though viscero-motor reflex may exist quite apart from peritoneal irritation yet in the majority of acute abdominal conditions peritoneal irritation is the exciting factor. The greater the chemical alteration of the peritoneal fluid from normal, the greater the irritation of the parietal peritoneum and the consequent muscular contraction. Thus the contraction is most marked where acid fluids are suddenly shot into the peritoneal cavity as in a perforated gastric or duodenal ulcer. The contents of the intestine, bile and urine have a less irritating effect and tend to produce less rigidity. Blood being almost identical in chemical composition with normal peritoneal fluid, does not act as an irritant. As the blood clots, slight irritation may be set up, and some slight rigidity may be produced. It is important to remember that a large effusion of blood may be present in the peritoneal cavity without rigidity.

Muscular rigidity produced by irritation of the parietal peritoneum is involuntary and cannot be controlled by the patient. It may cause defective mobility of the abdominal well during respiration. Where rigidity is present one must be satisfied that it is of this involuntary character, as voluntary rigidity is of no diagnostic value.

Differentiation of involuntary from voluntary muscular rigidity. (1) Gentle palpation for several minutes with the flat of the hand will cause voluntary rigidity to diminish or disappear. (2) Diverting the patient's attention will cause voluntary rigidity to relax. (3) There is always a momentary relaxation of the muscles between the end of one expiration and the commencement of the succeeding inspiration sometimes extending a little way into inspiration in voluntary muscular rigidity. Involuntary rigidity never relaxes under these conditions. It lasts as long as the peritoneal irritation causing it lasts, unless the muscle becomes exhausted or the reflex arc sufficiently dulled by the toxaemia. Even morphine, usually and fortunately, fails to abolish this sign entirely. Involuntary rigidity is diagnostic of some serious underlying lesion usually with some chemical irritation of the peritoneum, and is the strongest indication for surgical treatment that we possess. Absence of muscular rigidity is not a contra-indication for surgical treatment, however, as it may be entirely absent in cases of intra-abdominal haemorrhage.

DISTENTION OF THE ABDOMEN.—The steadily progressive distention of the bowels is strongly suggestive of intestinal obstruction or spreading peritonitis.

FREE GAS IN THE PERITONEAL CAVITY.—Free gas rises to the highest point, i.e. usually between the liver and the anterior abdominal wall and diaphragm, leading to a loss of the normal liver dulness. If there is no general distention of the bowels such as might force the transverse colon up above the liver, and liver dullness is absent, perforation of an air containing viscus is suggested. Loss of liver dulness is of great importance when it extends to the right axilla.

FREE FLUID IN THE PERITONEAL CAVITY.—This is shown clinically by the signs of "shifting dullness" and is not frequently seen in acute abdominal conditions but may be seen—(1) in a large internal haemorrhage, (2) after rupture of an organ containing much fluid, (3) after rupture of large cysts.

ABDOMINAL OF PELVIC SWELLING.—The presence of a mass in the abdomen or pelvis is of great diagnostic value. Its detection may be difficult on account of overlying muscular rigidity, but forcible pressure during examination must be avoided as dangerous. A swelling which could not be detected while the patient was conscious often becomes palpable under anaesthesia, and before incision is made palpation of the abdomen should be practised to determine whether such a mass is present. Definite swelling may be felt in some cases of intestinal obstruction especially in intussusception, also in obstructions from malignant growths, from faecal masses and from foreign bodies.

RECTAL EXAMINATION.—This should never be omitted and often aids in the diagnosis. One may palpate—(1) an inflamed appendix, (2) an appendicular abscess, (3) an intussusception, (4) a malignant growth in the rectum causing an obstruction, (5) an inflamed diverticulum, (6) a peculiar "ballooning" of the bowel below a malignant tumor too high to be felt.

Care must be taken to avoid errors in diagnosis in cases with acute abdominal pain. Tabes dorsalis, with its gastric, intestinal, and renal crises may simulate acute abdominal disease. The patellar and pupillary reflexes should always be tested to exclude this possibility. A more common difficulty is to differentiate an acute intrathoracic disease. The points to consider in making the differential diagnosis are—(1) The frequency of respiration is out of proportion to the abdominal symptoms. (2) A pulse—respiration ratio of less than three to one favors an intrathoracic cause; of more than three to one an intra-abdominal cause. (3) The average temperature in cases of an intrathoracic lesion is higher than an intra-abdominal one. (4) Occurrence of a rigor and of herpes labialis favors an intrathoracic lesion. (5) Abdominal tenderness is superficial and deep pressure is tolerated and may give relief with an intrathoracic lesion. (6) The rigidity of the abdominal muscles in intrathoracic inflammation assumes the character of the voluntary rather than the true involuntary type and momentary relaxation at the end of the expiration may be observed. (7) The detection of hyperalgesic areas on the abdominal wall suggests an intra-abdominal cause. Their absence is of no significance. (8) A rectal examination may assist; marked rectal tenderness suggests a peritoneal cause. If after careful consideration one is undecided, an exploratory laparotomy may have to be performed. Other conditions that sometimes lead to an error in diagnosis are cardiac disease, uraemia, lead and other poisoning, spinal caries, tumors of the cord, and acidosis in diabetes. These may present abdominal pain as a prominent symtom and should be borne in mind, and by careful history-taking and complete examination excluded.

GROUPS OF CASES.—Having decided that we are dealing with a true acute abdominal condition we must consider the possible causes. Except for some rare conditions these may be classified into five groups: (1) the colics, (2) the perforations, (3) the haemorrhages, (4) the inflammations, (5) the obstructions. This order represents roughly their suddenness of onset. Each group has its own particular features, though early symptoms in all may be identical, viz., (a) pain in mid line of abdomen, (b) vomiting, (c) shock.

THE COLICS.—These are characterised by—(a) extremely sudden onset of pain, (b) cessation of pain, (c) recurrence of pain.

The pain is referred to certain characteristic regions:

1. Biliary colic—pain felt in the epigastrium, radiates to the angle of the right scapula and occasionally to the tip of the right shoulder.

2. Renal colic—pain commences in the loin and radiates toward the groin, inner aspect of the thigh and testicle. Often tenderness of the testicle is present as the nerve supply is from the same spinal segments as the kidney. Associated with the pain is frequency of micturition and blood in the urine.

3. Intestinal colic—pain is felt all over

the abdomen. Tenderness of the abdomen is present in many cases but pain and tenderness are relieved by pressure such as never occurs in peritonitis. Relief is obtained by heat and the passage of flatus or faeces.

Muscular rigidity is frequently present especially in biliary and renal colic but is not of the unyielding character of involuntary rigidity. Restlessness is a marked feature of colic.

THE PERFORATIONS.—These are characterised by—(a) very sudden onset of pain, (b) severity of the initial shock which may soon pass off, (c) true involuntary muscular rigidity from the onset, (d) there may be signs of free gas in the peritoneal cavity. True involuntary muscular rigidity is the most important sign and demands immediate operation. Localization may be possible by—(1) observance of the area of most marked cutaneous hyperalgesia, (2) consideration of the previous history of the case, e.g. indigestion, typhoid fever, etc. Perforation of the bowel or stomach produced by a blow on the abdomen causes the contents to escape as the viscus ruptures and produces rigidity at once. Perforation of a hollow viscus by a bullet wound or stabbing does not cause the contents to escape and therefore rigidity is absent until inflammation extends to the parietal peritoneum.

THE HAEMORRHAGES.—Haemorrhage into one of the mucous cavities, if severe, is soon detected by the escape of blood from the stomach, bowels or bladder. Haemorrhage into the peritoneal cavity is apt to be overlooked. The diagnosis may depend on general signs of loss of blood. Whenever we meet with a history of sudden abdominal pain with a soft undistended abdomen we should remember the possibility of intraperitoneal haemorrhage. The diagnosis is made by the subsequent development of (1) steadily rising pulse, (2) increasing pallor, (3) restlessness. Haemorrhage from a ruptured spleen or liver does not cause muscular rigidity of the abdominal wall, but the associated injury of the lower chest wall may cause such rigidity by irritation of the intercostal nerves.

THE INFLAMMATIONS.—The main characteristics of this group are —(1) The onset is less sudden than in the above three groups and may be preceded by general symptoms of malaise. The pain steadily increases within a period which may be as long as several hours. A patient feeling perfectly well one minute and in violent agony the next is not suffering from an abdominal inflammation. (2) In this group alone the temperature may be raised in the early stages but one should not wait for rise of temperature to complete the diagnosis. (3) Cutaneous hyperalgesia is often present. (4) Definite local tenderness is detected early (may be found first per rectum). (5) Involuntary muscular rigidity appears only when the parietal peritoneum is affected and extends concurrently with the peritoneal irritation. (6) Swelling (due to plastic adhesion of omentum) may be palpable. () A rising leucocyte count is usually present with great increase in the number of polymorphonuclear cells.

THE OBSTRUCTIONS.—The chief characteristics of this group are—(1) colicky pain, usually of abrupt onset, (2) persistence of vomiting, (3) cessation of passing of stools or flatus. In a case of suspected obstruction if flatus fails to pass for twenty-four hours in spite of repeated enemata the diagnosis is practically certain, (4) progressive abdominal distention; (always calls for surgical treatment), (5) the absence of involuntary muscular rigidity.

In intussusception we have the passage of blood and mucous per rectum and the presence of a sausage-shaped tumour which is most in evidence as the peristaltic wave passes along it. It may be felt with difficulty, on account of voluntary muscular rigidity. There is, however, a momentary relaxation at the end of expiration.

Chronic intestinal obstruction often ends acutely. Such cases can usually be recognized by two features never found unless obstruction has been present some considerable time. (1) The outline of individual dilated coils may be seen. (2) Visible peristalsis may be present. These features are never seen in the normal state, and when they can be seen in a case whose symptoms suggest acute obstruction they indicate its primarily chronic nature.

MacKenzie—Symptoms and Their Intrepretation, London, 1909.

David Ligat—Lancet, May 3rd, 1919.

A Talk on Gastric and Duodenal Ulcer.

BY PROF. WILKIE.

THE Medical Faculty of the University of Toronto was greatly honoured by the recent visit of Prof. Wilkie of Edinburgh, and Mr. Sampson Handley of London. These most distinguished gentlemen were introduced to the final year by Prof. Starr.

On this occasion Prof. Wilkie took the opportunity of citing a few cases and facts relating to gastric and duodenal ulcer. He first pointed out that a condition of dyspepsia might be considered as due to organic causes or to reflex causes. In considering the former group one of the chief factors was ulceration not due to specific infections or to malignancy. This large group characterised by simple ulceration was to be divided anatomically and clinically into gastric ulcer and duodenal ulcer.

In discussing the symptomatology of these two conditions the speaker stressed certain clinical phenomena which are of diagnostic value. The methods of obtaining relief from pain in these conditions were, he felt, some indication as to the cause of the pain. From this viewpoint, the pain could be considered as due to both the presence of acid gastric secretion and muscular contraction of a more or less spasmodic nature. But in cases showing a history of pain, the ulcer in question was, he thought, a chronic one. In the light of our present knowledge of pathology these most certainly must have commenced as acute ulcers.

The cause of acute ulcers, the speaker continued, might be considered as secondary to various blood stream infections. As suggestive of this he cited the following cases:

1. A case of ruptured appendix followed by generalized septic peritonitis. Necropsy showed multiple small acute ulcers of the gastric mucosa.

2. Case of burns in a male aged 46, in which burns became septic and death occurred on the ninth day. Necropsy showed numerous petechial haemorrhages under the gastric mucosa with acute ulceration in the first part of the duodenum and along the lesser curvature of the stomach.

3. Case of severe burns in a boy aged 15. Sepsis intervened and death occurred on the tenth day. Necropsy showed a large acute ulcer in the duodenum.

4. Case in a male aged 16, who died of infection on the sixteenth day. Necropsy showed an acute ulcer in the first part of the duodenum.

These cases of burns with acute ulceration of the stomach and duodenum were quite worthy of note in the speaker's estimation.

The prevalence of cases of ulceration showing infection of the mouth, gums or throat certainly suggested a possible relationship. It was also pointed out that the sites of ulceration, the lesser curvature of the stomach and the first part of the duodenum, were also the sites of the densest concentration of submucous lymphoid follicles. Infection of these follicles with subsequent abscess formation and rupture into the lumen of the gut produced the typical acute follicular ulcers. A slide was shown showing a necropsy specimen from a case of peritonitis following appendicitis in which infection of the follicles caused a granular appearance of the mucosa of the first part of the duodenum. The organisms could be considered as coming from two sources, the systemic circulation and by means of retrograde emboli along the epiploic veins. The experiments of Eiselberg and some case histories were cited in the latter connection. In one case, at operation considerable of the great omentum had been removed with ligation of the vessels; subsequently large acute ulcers had formed on the lesser curvature of the stomach.

It was pointed out that both the areas which were common sites of ulceration derived their blood supply from the coedlic axis and that it had been shown by the Mayo Clinc that the vessels supplying the areas in question were more tortuous than other vessels supplying the rest of the stomach and duodenum.

The speaker mentioned briefly the treatment of ulcers and in closing stressed the many points in connection with this subject on which we are still uncertain.

A. W. S.

Visit of The Cambridge University Medical Society.

STUDENT tours from America to Europe have become frequent, but the Cambridge University Medical Society tour of 1926 is among the first from England to this continent. The party, 79 in number of whom 73 were undergraduates, —arrived in Toronto on August 25th after having visited Quebec, Montreal, and Kingston. Their accommodation was arranged for at the University Residences.

The itinerary included visits to the Toronto General Hospital, Hospital for Sick Children, Psychiatric Hospital, and the Academy of Medicine. They also visited the Medical, Anatomial, and Insulin Buildings. Addresses were given concerning the method of administration of the University, and outlining of the medical course at Toronto.

During the remainder of the stay the visitors proceeded individually to enjoy themselves—the Canadian National Exhibition proving a source of entertainment. From Toronto they went by special accommodation on the Canadian National Railways to Niagara Falls and on to Washington, Baltimore, Philadelphia, New York, New Haven, and Boston. They set sail on September 11th for home.

The value of such tours is inestimable and they should help to give the next generation a broader outlook on life as well as knowledge of affairs on this side of the Atlantic.

Dr. Ryerson received the following letter shortly after the visitors sailed for home.

Trinity College,
Cambridge.
20th. September, 1926.

Dr. E. S. Ryerson,
Secy. Faculty of Medicine,
University of Toronto.

Dear Sir,

Feeling that we have gained so much from our visit to you, during the recent tour to Canada and the U.S.A., we have got together a small committee who will endeavour to show Canadian Medical Students something of the work which goes in our English Medical Schools.

We are afraid that in the past, visitors to England have not had sufficient opportunity to meet and participate in the activities of their fellow-Students.

We suggest that any of your medical students who propose to visit England should communicate with:

The Hon. Secretary,
Cambridge University Medical Society,
Downing Street,
Cambridge.

In Cambridge, G. Wymme Thomas, of Emanuel College will arrange to show them something of our University Life and anything else in which they are specially interested.

During Term Time it should be possible to house occasional visitors in our Colleges themselves.

In London, Mr A.. W. Franklin, of 27 Wimpole St., and in Oxford, Mr. H. E. Mansell of Pembroke College, will be pleased to assist in the entertainment of the visiting Medical students.

Trusting this may help still further to diminish the size of the Atlantic.

I am,

Yours sincerely,

James D. Simpson,
Hon. Sec., Camb. Unv. Med. Socy.

A Song of the Sick Kids.

In ancient days before A.B.
Raised the deuce at H.S.C.;
All of our drinks were hard and raw,
There was no prohibition law.

Our milk had then a hearty kick
It made the G. P.'s more than sick;
It knocked them for an endless row
To their eternity of woe.

From city water grew in state,
B. Coli on each agar plate;
And C.L.O. and orange juice
Were rarely fit for human use.

But prohibition came to us
(We're glad to say without much fuss)
And now our milk's not hard but boiled:
Meade-Johnson keeps us daily oiled.

Our orange juice from sunny south
Is safely given by the mouth
Or other routes. The sterile plate
Bears witness to B. Coli's fate.

No politics can enter here
To spoil our health or make us fear,
Return of former septic stuff.
We have the best, it's good enough.

—STRATHEARN.

The New Medical School at Rochester, N.Y.

On October the 25th and 26th a Medical Conference was held in Rochester to commemorate the opening of the School of Medicine and Dentistry. The school was founded in 1920 through gifts of Mr. George Eastman and the General Educational Board of the Rockerfeller Foundation and opened to the first class which numbered twenty-three in 1925. To the school are attached the Strong Memorial Hospital and the Municipal Hospital with a total accommodation of 430 patients. The School and Hospitals are under the management of a full time staff all members of which, except heads of departments, live in.

The conference commenced by a public meeting at which the degree of D.Sc. was conferred on Dr. Heinrich von Muller and Dr. Andrew Balfour, of the London School of Hygiene and Tropical Medicine and at which Dr. John Campbell Merriam, president of the Carnegie Institute of Washington, spoke on "The Relation of Medicine to the Evolution of Society."

Monday afternoon and evening and Tuesday morning were devoted to the presentation of papers on "Recent Advances in Infectious Diseases," "Immunity," "Action Current in Nerve," "Relation of Muscle to Nerve," and on "The General Pathology of Joint Disease."

On Tuesday afternoon the first surgical clinic of the school was given by Dr. Harvey Cushing on "Acromegaly," at which he presented a patient whose malady had recently been diagnosed and a patient on which he had operated in 1914. This was followed by the first medical clinic of the school given by Dr. Von Muller on "Chorea," at which he presented two patients showing different stages of Huntington's Chorea. The conference closed by an address on "The Students' Education and Preventative Medicine," by Dr. Balfour. The content of the address and the personality of the speaker held the audience enthralled. This audience crowded the amphitheatre which seats 700. The continued applause which followed surely acknowledged the great effect produced on all present.

Dean Primrose, Professor Graham and Drs. Olmstead, Oille, and Fletcher McPhedran, were present, representing the University of Toronto. W.C.M.S.

The Numbers of The Medical Profession in Great Britain. *

A REVIEW OF FIFTY YEARS.

Since the year 1876 the General Medical Council has kept an analytical record of the number of names entered in, added to, or removed from the *Medical Register* in each twelve months. The *Medical Register* has been published annually since the Council was constituted under the first Medical Act of 1858; but before 1876 no such data as these were ascertained or preserved.

The following table indicates the varying proportion of registered medical practitioners to population during the period under review. It gives the population of the British Isles at each decennial census since 1881, and the number of names on the *Medical Register* in the same year; also the corresponding totals for the year 1925, that for the general population being an estimate.

* Reprinted from B.M.S., Sept. 4, 1926.

Proportion of Practitioners to Population.

Year.	Registered Practitioners.	Population, British Isles.
1881	23,275	35,241,482
1891	29,555	38,104,975
1901	36,912	41,976,827
1911	40,913	45,370,530
1921	45,408	47,263,196
1925	51,738	48,225,000

The figures show a general tendency (much more marked in recent years) towards an increase in the ratio of doctors to population. The number of registered practitioners at the end of 1921 was almost exactly double the number at the end of 1876, but the population of Great Britain and Ireland with that period only increased by about 50 per cent. During the year 1925 the new medical registrations numbered 2,570, and there was a net increase of 1,703 names. Owing to the large increases during the past five years, reflecting the excessive entries of students immediately after the war, there is now more than one name in the *Medical Register* to every thousand of population. In the United States of America, according to an estimate by the *Journal of the American Medical Association*, there is at the present time one medical practitioner to every 753 people. Next to the United States the British Isles appear to have the highest proportion of practitioners to population.

Another True Tale. *

SHOULD you ask me whence this story,
Whence this legend and tradition,
I will answer, I will tell you.
It was not in days of Rahere,
Or in days of Abernethy,
But it was last Thursday fortnight
That a patient with a headache
Staggered up with gait ataxic
(Also very slightly spastic),
Staggered up into the Path. Lab.,
Where a very clever doctor
Pushed a very slender needle
To the centre of his backbone.
Forth there spurted under pressure
Clear and limpid spinal fluid,
Quite enough for diagnosis.
He withdrew the slender needle,
Pulled it out "secundum artem,"
And applied a small gauze dressing;
Told the patient to recline him
On a couch of hardest timber
Till he felt a little better.
Then the very hungry doctor
Went along to tea and left him.
But the fluid went on dripping,
Through the gauze and through the bandage;
On the floor a pool was forming.
Soon the patient felt quite thirsty,
So he drank a quart of water,
And secreted much more fluid,
Which kept flowing ever onwards,
'Neath the door and down the lift-shaft,
On the patent gateway switchbox,
Where its quite unwonted presence
Fused the wire and closed the circuit.
Then the lift stopped with a shudder
Just between the third and fourth floors,
And within the lift imprisoned
Was a most distinguished surgeon,
Using most distinguished language
Till they found the electrician,
Three hours later, and released him.
When they sought the wretched patient
Who had caused this sad disturbance,
All he said was—"Look 'ere, guvnor,
That there trick is just the limit,
Made me feel that bloomin' thirsty,
I'm across the road to 'ave one."
Now you see, O gentle reader,
Why the lift that's in the Path. Block
Sometimes falters on its journay,
Sometimes stops with you inside it.
Should this hap to be your fortune,
Cease your unbecoming language;
Use your unaccustomed leisure,
Climb the stony hill of knowledge:
Meditate upon the functions
Of the mystic choroid plexus,
Functions most of which perplex us.

*Reprinted from St. Bartholomew's Hospital Journal. July, 1926.

Interfaculty Track Meet.

First evidence that the 1926-27 season is to be another of triumph for the Medical Faculty in athletics, was obtained on Friday, October 15, when Meds. duplicated their feat of last year and won the Interfaculty Track Meet. The representatives of this Faculty had a lead of six points over Arts who finished in second place.

'Mo' Mitchell scored ten joints for Meds. when he won the mile and half-mile events, in record time. Geo. Sparrow, Evan Shute, and Hugh Crawford, were placed first in their events and made highly creditable showings. Other point winners for Meds. were, Vic. Burns, who was placed in three events, Jack Wright, second in the high jump and two freshmen

Soccer.

The faculty is represented in the soccer series this year by an exceptionally strong team. The schedule is now beginning and Meds' will very likely be among the winners.

Mulock Cup Games.

Sr. Meds. last year's winners of the Mulock Cup, won their first game of the present season by default. Sr. School, against whom they were drawn, were unable to muster a team.

Jr. Meds. trounced Jr. Arts, 7-3, in the first game played in the junior group.

Medical Track Meet.

Keen competition and excellent records marked the 1926 Medical Track Meet which was held at the Stadium on Monday, Oct .11. The fourth year, 2T9, last year's winners of the inter-year championship, retained the laurels, while 'Mo' Mitchel, again captured the individual honours. Geo. Sparrow was second to Mitchell in the race for the individual championship and Evan Shute was third. In the year competition, 2T9 were several points ahead of their nearest rivals, the graduating year.

The humorous feature of the meet was a relay race between A and B sections of the first year. Many of the frosh ran with feet unclad, while others essayed to do their lap handicapped with heavy walking boots. After the race a coin was flipped to determine which was the winning squad.

A half holiday was declared for the meet and a fair crowd was in attendance. Members of the Faculty acted as judges and "Duke" McGarry was the starter.

Water Polo.

Sr. Meds. are leading their group in the Interfaculty Polo competition. The team won their first game of the season against Dents, 2-1, while recently they downed Sr. School, 5-4, in a hard-fought struggle.

Jr. Meds. have been less fortunate. They lost their first two starts.